# Success Factors of Student Startups in Korea: From Employment Measures to Market Success

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**Abstract**     The Korean government has focused on universities or colleges as the main targets of its startup policy since the 2010s. However, the performance is not so good, with a low survival rate. The purpose of this study is to examine the factors that underpin the success of student startups. First, through a review of the literature, this study compared the success factors of student startups with those of venture startups, which means the general startup sector, as well as youth startups, also a focus of startup policy targeting youngsters outside universities or colleges. Second, we analyzed case studies of startup companies connected University H. The literature review showed that the main target of student startups is the employment of university students. There is a lack of studies on success factors; existing studies only emphasize the entrepreneurship of students. The results of case studies showed several factors of success similar to those of general venture startups: founders, business model and resources including team, and mentoring.

## I. Introduction

Startups are prioritized in every country, and governments are also actively pursuing startup policies. As of the end of 2017, the Korean government supports 76 projects and contributes education, facilities, mentoring, consulting R&D, and policy funds through more than 800 startup support programs administered by the central and local governments (Shin et al., 2018).

In Korea, the government categorizes the group of youth startups as companies run by under-39 year-old persons. Youth startups began with the intention of reducing the high unemployment rate of young people (reaching 10%

in August 2008, Statistics Korea). The focus on youth startups becomes more evident. In the Big KINDS DB, a media database from the Korean Press Foundation, youth startups were mentioned less than 300 times in the media before 2007, but more than 2,500 times in 2016.

However, the performance of youth startups is not particularly good. Jeon (2012) pointed out that youth startups face ineffective funding, startup education and lessons, even though there have been active policies. As a result, paper startups which target only government support and startups with no prospect of solvency are increasing, and innovation-based startups account for only 0.5% of the total (Shin et al., 2018). In this situation, the government shifted its focus to university or college student startups since the early 2000s. Hence, the government classified the startups into three types - venture startups, youth startups, and student startups. The venture startup refers to a technology-based startup that gets funding from venture capital or the Technology Guarantee Fund, or it originates from research and development in colleges or government research laboratories. A youth startup is a startup established by under-39 year-old persons, and a student startup is a startup set up by university or college students (Chang et al., 2018; Lim, 2015; Ministry of Government legislation, 2018).

In the past, Techno-park or Techno-poles were emphasized as the base of startups, but universities have been recognized as an important base for startups (Shin et al., 2018). This trend is based on two facts: First, the college enrollment rate in Korea is about 80%, so universities can be a good source for startups. Second, student employment rate after graduation is only 66% in 2016 (Ministry of Education, Education Statistics, 2018), so the government wants to boost employment opportunities. In this situation, we want to identify the current status of student startups and the success factors of student startups compared to youth startups and venture startups. Our approach is two-fold: a literature review of existing studies and the examination of two case studies related to success and failure.

This study proceeds as follows: Chapter 2 presents the framework of this study. Chapter 3 introduces the literature review with methods, data and results. Chapter 4 is the analysis of the success and failure cases of student startups. Chapter 5 discusses the implications and Chapter 6 presents conclusions and limitations of the research.

To help the understanding of the types of startups, youth startups and students startups can be said as the employment measures of the government for young generation in Korea, and the history of the policies are short compared to general startup policy. Therefore this study wants to clarify the situation of the startups and chage the policy toward market success.

## II. Theoretical Consideration

### 1. Types of Startups

The types of startups are divided by demographics and business characteristics. First, from a demographic perspective, Ko (2011) classified the type of startups by age: 20s as adventure startup, 40s as professional startup, and 50s as safety startup. This may be the old style of Korean startups, but in the current style, even the startups of the 50s and 60s are an adventure.

Second, startups are classified according to business characteristics such as organization and business model. In an organization perspective, startups are divided into one-person startups, co-startups, and team startups. In addition, in a technology utilization perspective, startups are classified into small-scale startups and venture startups (Chang et al., 2000) or general startups and technology startups (Kim et al., 2015). In Korea, venture startups refer in most cases to startups based on technology.

### 2. Policies of Korean Student Startups and Results

Support for student startups has grown rapidly through two government ministries: the Ministry of SMEs and Startups and the Ministry of Education. The representative program of the first ministry is the Program of Startup Leading University (SLU Program), since 2011, and that of the second ministry is the Leaders in the Industry-University Cooperation (LINC) Project, since 2011. The SLU program is focused on the incubation center, and the LINC project focuses on supporting startup clubs, startup lectures, and personnel expenses for startup experts (Heo et al., 2017). Further, a third ministry, the Ministry of Science and ICT, has launched the Startup Business Model Verification Program in 2012. All these programs aim to establish a startup ecosystem in universities.

As a result, there are 5,468 startup clubs with 45,387 students in 422 universities in 2017 (Korea Institute of Startup and Entrepreneurship Development, 2018). However, the number of students participating in startup clubs only accounted for 1.4% of all the students at the end of 2016. The average sales of startup companies are around US$10,800. The number of students in startups and the size of student startups is very small. Although there are no survival statistics on student startups, from field experience, it does not surpass the overall survival rate of Korea's general startups: 62.7% after one year; 27.5% after five years, in case of 2015 startups (National Statistics Office, 2018).

## 3. Concept of Startup Success

Let's define the concept of startup success. First, the concept is defined as the successful market entry (Lee and Kim, 2013). Second, the concept refers to real successes in the market, such as generating earnings and securing sustainability (Park et al., 2013). However, it is not advisable to exclude sustainability in discussing startups with high death rates. Therefore, the concept of startup success is defined as sales after three years of operations. And we divide the stages of success into startup trials, market entry and market success.

## 4. Startup Success Factors

There are not many studies that analyze the success factors of a startup in a comprehensive way because existing studies tend to focus on specific characteristics of startups, such as entrepreneurship, government support, activation, and profit or business performance.

Seol and Lee (2002) suggested five factors that increase the market value; technical factors, market factors, resources, profitability, and management ability. Kim (2012) analyzed the success and failure cases of technology commercialization of SMEs and found that they are influenced by an understanding of technology and market, managers' profile, related experiences of business model, and corporate resources. Go et al. (2003) pointed out the founder, organization, resources, startup process, market and industrial environment, and government policy as factors influencing the performance of venture firms. Also, Ham and Ko (2016) analyzed the success stories of Kolmar BNH Co. Ltd., Korea's first Research Institute Spin-off Company. The study pointed out that the Government Research Institute, which is a mentoring institute, is a key to success.

Cho (2018) studied the enhancement of survival rate. The study pointed out that failure derives from the lack of marketability of business model. There are three factors of success: customer orientation, technology differentiation strategy, and funding. Among these factors, the critical one is the customer orientation of startup or business model. Also, the study highlighted that corporate factors such as technology differentiation are more important than market factors such as industry growth for the survival rate.

## 5. Analytical Framework

These factors are summarized as technical factors, market factors, various attributes related to startup founders, corporate resources and various support systems to support startup founders. These are shown in Table 1.

**Table 1 The analytical framework of this study**

| Category | Sub-category | Explanation |
|---|---|---|
| Business model | -Technology<br>-Market | - Product planning, Technology, and product development, Subsequent product development<br>- Market size, Growth rate, Industrial environment |
| Founder | -Demographic characteristics<br>-Startup motive<br>-Startup attitude<br>-Startup capability | - Sex, Age, Education<br>- A desire to accomplish, Vision/Goal, Spirit of independence<br>- Risk sensitivity, Endurance, Positive thought, Secure trust<br>- Experience, Startup experience, Technical knowledge |
| Resource | -Human resource<br>-Market<br>-Funds<br>-Others | - Secure a talented person, Number of executives and staff members, team members<br>- Marketing strategy, Operating activities<br>- Financing capability, Securing funds<br>- External activities, Network strategy, and Size |
| Support system | -Government,<br>-Society<br>-University | - Startup promotion policy,<br>- Social value<br>- University program, |

# III. Research Review

## 1. Data and Methodology

Previous researches used in this study were collected through an academic information database. Academic information research service (RISS) was used for domestic research and SCOPUS was used for overseas research. The related keywords were searched by setting the search scope as title, keyword, as well as by using such keywords as student startup, youth startup and venture startup.

**Table 2 Data search results**

| Category | | Single Search | | | Success factors Combined Search | | |
|---|---|---|---|---|---|---|---|
| | | Student Startup | Youth Startup | Venture Startup | Student Startup | Youth Startup | Venture Startup |
| Range 1 (Title) | Korea | 261 | 172 | 371 | - | 3 | 15 |
| | Overseas | 12 | 3 | 57 | - | - | 2 |
| Range 2 (Keyword) | Korea | 56 | 90 | 223 | - | 1 | 6 |
| | Overseas | 25 | 1 | 119 | - | - | 4 |
| Range 3 (All) | Korea | 540 | 671 | 3,357 | 46 | 107 | 472 |
| | Overseas | 340 | 23 | 1,090 | - | 13 | 44 |

Results showed that domestic research identified 46 student startups, 107 youth startups, and 472 venture startups. Overseas studies produced fewer

results than domestic studies. While research on student startups was not identified, 13 youth startups and 44 venture startups were found. The reason why there are not many studies dealing with students startups is as follows: First, the emphasis on the specific groups such as students startups or youth startups have originated from government policy and is now in the starting stage. Second, therefore, those studies focus more on startup trials than successful startups.

## 2. Results

In this section, the general success factors of venture startups are analyzed as a starting point for discussion. Further, we introduce success factors related to youth startups and student startups.

### 2.1 Founder

The success factors of startup founders are divided into general demographic factors such founder's motivation, attitudes, and capabilities as shown in Table 3. First, gender from a demographic perspective (Lee et al., 2014; Mazzarol et al., 1999) and age (Lee et al., 2014) are suggested as success factors. The academic background of the startup founder is also pointed to as a success factor (Lee et al., 2014; Robinson et al., 1994; Lee et al., 1998).

Second, motivation is also presented as success factors such as achievement desire (Yun et al., 2008; Lee et al., 1998; Lee et al., 2014), vision (Lee et al., 1998; Kim et al., 2006; Sim et al., 2014; Baum et al., 2004), and goal (Lee et al., 1998; Lee et al., 2014; Baum et al., 2004).

Third, attitudes are pointed out as success factors; internal and external trust (Lee et al., 2001; Kim et al., 2006), risk-taking tendency (Lee et al., 1998; Lee et al., 2014), perseverance (Baum et al., 2004; Lee et al., 2014), positive thinking (Lee et al., 2001) and aggressive business promotion attitude (Lee et al., 2001; Baum et al., 2004).

Fourth, in the founder's capacity category, there are 3 sub-categories; experience, management, and knowledge/technology. First of all, in the founder's experience, the main success factors are experience of startups (Lee et al., 1998; Lee et al., 2014) and working experience in related industry (Lee et al., 1998; Kwon et al., 2012; Lee et al., 2014; Robinson et al., 1994). In management sub-category, factors are the ability to recognize opportunities in the market (Baum et al., 2001; Chandler et al., 1992) along with business management (Go et al., 2003; Lee et al., 2001; Chandler et al., 1992) and organizational management (Baum et al., 2001) from the perspective of startup. Also, in the knowledge/technology, major study (Kim et al., 2006) and industry knowledge/technology (Cheon et al., 2013; Lee et al., 1998; Lee et al., 2001; Kwun et al., 2012; Go et al., 2003; Baum et al., 2001; Chandler et al., 1992)

related to startup business model are indicated as success factors. Lee (2017) argues that the capability of the startup founder is the most critical success factor.

**Table 3 Comparison of the success factors of founders**

| Category | | | Venture startup | Youth startup | Sudent startup |
|---|---|---|---|---|---|
| Demographic | Gender | | Lee et al. (2014), Mazzarol et al. (1999) | Jeon (2012) | Cho et al. (2016), Huh (2016), Blanchflower (2000) |
| | Age | | Lee et al. (2014) | Jeon (2012) | Cho et al. (2016) |
| | Academic background | | Lee et al. (1998), Lee et al. (2014), Robinson et al. (1994) | - | Blanchflower (2000), Cho et al. (2016), Kim (2012) |
| Motive | General | | Lee (2017) | - | - |
| | Achievement desire | | Yun et al. (2008), Lee et al. (1998), Lee et al. (2014) | Song et al. (2012) | Chang et al. (2013) |
| | Vision/Goal | | Lee et al. (1998), Kim et al. (2006), Sim et al. (2015), Lee et al. (2014), Baum et al. (2004) | - | - |
| | Independence | | - | Douglas et al. (2002) | - |
| | Economic level | | - | - | Huh (2016) |
| Attitude | Risk-taking tendency | | Lee et al. (1998), Lee et al. (2014) | Douglas et al. (2002) | Chang et al. (2013), Segal et al. (2005) |
| | Perseverance | | Baum et al. (2004), Lee et al. (2014) | - | - |
| | Positive thinking | | Lee et al, (2001) | | |
| | securing trust | | Lee et al. (2001), Kim et al. (2006) | | |
| | aggressive attitude | | Lee et al. (2001), Baum et al.(2004) | | |
| Capability | Experience | Startup | Lee et al. (1998), Lee et al. (2014) | Kim et al. (2016) | Cho et al. (2016), |
| | | Industry | Lee et al. (1998), Kwun et al. (2012), Lee et al. (2014), Robinson et al. (1994) | | - |
| | Startup management | Opportunity recognition | Baum et al. (2001), Chandler et al. (1992) | Kim et al. ((2016) | - |
| | | Manager | Lee (2017), Go et al. (2003), Lee et al. (2001), Chandler et al. (1992) | Lim et al. (2015) | |
| | | Organizational management | Baum et al. (2001) | Lim et al. (2015) | |
| | Technology Knowledge | Major knowledge | Kim et al. (2006) | - | - |
| | | Industry technology | Cheon et al. (2013), Lee et al. (1998; 2001), Kwun et al. (2012), Go et al. (2003), Baum et al. (2001), Chandler et al. (1992) | Kim et al. (2016), Lim et al. (2015) | Kim et al. (2014) |

In the case of youth startups, Jeon (2012) argues that the gender and age of the startup founder has a bearing on the success factors. And from the motivational point of view, desire for achievement (Song et al., 2012) and independence (Douglas et al., 2002) are important. In addition, success factors involve a risk-taking tendency (Douglas et al., 2002), pre-startup experience (Kim et al., 2016), opportunity recognition in the market (Kim et al., 2016), management capability (Lim et al., 2015) and industrial technology knowledge (Kim et al., 2016; Lim et al., 2014).

In the case of student startups, demographic factors are the same as in the case of venture startups, that is, gender (Cho et al., 2016; Huh, 2016; Blanchflower, 2000), age (Cho et al., 2016) and academic ability (Blanchflower, 2000; Cho et al., 2016; Kim, 2012). However, the motivation category is indicated by the desire for achievement (Chang et al., 2013) and economic level (Huh, 2016). Attitude is indicated only by the risk-taking tendency (Chang et al., 2013; Segal et al., 2005). Also, capability suggests startup experience (Cho et al., 2016) and knowledge of industrial technology (Kim et al., 2014).

## 2.2 Business Model

A business model includes many facets of startups, but in this sub-section, the concept is only to product. Then, the characteristics of business model are divided into technical factors and market factors among others. Whereas technology factors include product planning, development, production, and improvement, success factors are as follows.

Technology factors are organized into three categories: product planning, product development and product improvement. Product planning suggests differentiation (Lee et al., 1998; Lee et al., 2001; Kim et al., 2006) and cost leadership (Lee et al., 1998) based on competitive strategy (Sim et al., 2015; Kim et al., 2006), and securing the superiority of core products (Kim et al., 2000; Oh et al., 2002). In product development, success factors are linked to necessary technology (Yun et al., 2008; Go et al., 2003; Shin et al., 2010; Sim et al., 2015) for development through technological innovation (Oh et al., 2002) or licensing of advanced technology (Kim et al., 2000), creative use of these technologies (Lee, 2017), and proper production and procurement of parts (Kim et al., 2000). In product improvement, efforts (Kim et al., 2006; Lee, 2017), upgrade (Oh et al., 2002) by continuous quality improvement (Lee et al., 2001) are also suggested as critical success factors.

In terms of market factors, success factors are market size (Go et al., 2003), market growth rate (Yun et al., 2008; Lee et al., 1998; Lee et al., 2014) and competitive situation (Yun et al., 2008; Shin et al., 2010; Lee et al., 1998; Lee et al., 2014).

As regards youth startup research, only the development of new products as a technology factor (Song et al., 2012) is suggested as a success factor. Also, in

the study of university students, only market size (Cho et al., 2016) is suggested as a success factor.

<p style="text-align:center">**Table 4 Comparison of the success factors of business model**</p>

| Category | | | Venture startup | Youth startup | Student startup |
|---|---|---|---|---|---|
| Technology factors | Product planning | Competitive advantage | Sim et al. (2015), Kim et al. (2006), Kim et al. (2000), Oh et al. (2002) | - | - |
| | | Discrimination capability | Lee et al. (1998), Lee et al. (2001) Kim et al. (2006) | | |
| | | Cost leadership | Lee et al. (1998) | | |
| | New product development | Technology resource | Yun et al. (2008), Go et al. (2003), Shin et al. (2010), Sim et al. (2015) | Song et al. (2012) | - |
| | | Technology innovation/Technology introduction | Lee et al. (1998), Lee et al. (2001), Kim et al. (2006), Oh et al. (2002), Lee (2017), Kim et al. (2000) | | |
| | | Use of technology | Lee (2017) | | |
| | | Production | Kim et al. (2000) | | |
| | Product improvement | Quality / Others | Kim et al. (2006), Lee (2017), Lee et al. (2001) | - | - |
| | | Upgrade | Oh et al. (2002) | | |
| Market factors | Market size | | Go et al. (2003) | - | Cho et al. (2016) |
| | Market growth rate | | Yun et al. (2008), Lee et al. (1998), Lee et al. (2014) | | - |
| | Market structure | | Yun et al. (2008), Shin et al. (2010), Lee et al. (1998), Lee et al. (2014) | | - |

### 2.3 Resources

Resources of startups are classified into core manpower, marketing, funding, and network, as shown in Table 5.

First, core manpower should be secured by the startup team (Lee et al., 2001; Sim et al., 2015; Lee et al., 2014) and the talent needed after the company is up and running (Lee et al., 2001; Yun et al., 2008). Other success factors include marketing strategies for market penetration (Lee et al., 2014) and activities for the market channel (Kim et al., 2000). Many studies pointed out the importance of funding, which is financing capacity (Sim et al., 2015; Go et al., 2003; Kim et al., 2000; Kim et al., 2006; Cheon et al., 2014). Also, utilization of external resources is also a critical success factor. Network strategy to utilize external

resources (Sim et al., 2015; Lee et al., 1998) and external resource linkage activities (Kim et al., 2006; Kim et al., 2000) such as network size, trust, and frequency (Kwon et al., 2012) are raised as success factors of venture startups.

In their youth entrepreneurship study, Bang et al. (2014) presented the startup team as a success factor in the case of the 20 year-old startup founders with low technical capability. Also, marketing is a critical success factor when a female startup founder with technical capability completes the development of a new product. On the other hand, research on success factors related to startup resources has not been confirmed in the case of a university student startup.

**Table 5 Comparison of success factors of resources**

| Category | | Venture startup | Youth startup | Student startup |
|---|---|---|---|---|
| Core manpower | Startup team | Lee et al. (2001), Sim et al. (2015), Lee et al. (2014) | Bang et al. (2014) | - |
| | Securing a talented person | Lee et al. (2001), Yun et al. (2008) | - | |
| Sales | Marketing strategy | Lee et al. (2014) | Bang et al. (2014) | - |
| | Sales activity | Kim et al. (2000) | | |
| Funds | Funding capability | Sim et al. (2015), Go et al. (2003), Kim et al. (2000) | - | - |
| | Securing the required funds | Kim et al. (2006), Cheon et al. (2014) | | |
| Network | Network strategy | Sim et al. (2015), Lee et al. (1998) | - | - |
| | Network activity | Kim et al. (2006), Kim et al. (2000), Kwun et al. (2012) | | |

## 2.4 Support System

The startup support system is divided into government, society, and university, as shown in Table 6. In case of venture startups, government-centered success factors such as government policy for venture companies (Go et al., 2003) and startup support from government-sponsored research institute (Ham and Ko, 2016) are suggested.

As regards youth startups, research confirms government and society support system as the success factors. First, from the government perspective, specific policy instruments such as startup funding assistance (Song et al., 2012; Jeon, 2012), startup education (Jeon, 2012), and startup marketing (Jeon, 2012) are suggested as success factors. Also, from a social point of view, Kim et al. (2016) argue that the support of the network of startup founders, such as parents,

colleagues, and acquaintances, has a significant influence on the youth startup intentions.

**Table 6 Comparison of success factors of support system**

| Category | | Venture startup | Youth startup | Student startup |
|---|---|---|---|---|
| Government | Support policy | Go et al. (2003) | Song et al. (2012), Jeon (2012) | Kim et al. (2014) |
| | Public sector support | Ham and Ko (2017) | - | - |
| Society | Surrounding network | - | Kim et al. (2016) | Chang et al. (2013) |
| | Parent startup experience | | - | Huh (2016) |
| | Startup success model | | | Cho et al. (2016) |
| University | Entrepreneurship education | - | - | Souitaris et al.(2007), Walter et al.(2013), Peterman et al.(2003), Chang et al. (2013) |
| | Startup support activities | | | Cho et al. (2016) |
| | Startup mentoring | | | Chang et al. (2013) |

The study of university student startups suggests that the startup support policy from the government perspective (Kim et al., 2014) and the network support from a social perspective (Chang et al., 2013) are success factors. However, because of the identity of the student, the experience of the parents (Huh, 2016) and successful model of the startup (Cho et al., 2016) are presented from the social perspective. In addition, the university's entrepreneurship program operation (Souitaris et al., 2007; Walter et al., 2013; Peterman et al., 2003; Chang et al., 2013), startup support activities (Cho et al., 2016) and startup mentoring (Chang et al., 2013) are suggested as success factors.

## 3. Summary of the Section

The following is a summary of the above discussion. First, the perspective of success is different depending on the type of startups. Venture startups were studied from the perspective of market success, and youth startups were researched from the viewpoint of market entrance. Also, many studies have been conducted on the factors influencing entrepreneurship and startup intentions. Here, university startups are seen as a success of the startup trial itself. Second, there are not many studies of startups in any particular group in Korea. This result is due to the government policies have only just begun. Third, most of the research aimed to investigate the factors affecting startup trials rather than startup success both regarding student startups and youth startups. Fourth, there

is no research on startup resources, especially about student startups. There is not much research on student startups or youth startups, but it is shocking that there is no mention of this aspect. Fifth, the role of universities is regarded as a part of a social support system in youth startups and general venture startups, and is treated implicitly. However, market success or not, establishing a startup business is important from the university.

**Table 7 Summary of the literature review**

| Category | | Venture startup | Youth startup | Student startup |
|---|---|---|---|---|
| Perspective | | Market success | Market entry < Startup trial | Startup trial |
| Founder | Demographic | Gender, Age, Academic background, Major related | Gender, Age | Gender, Academic background, Economic level |
| | Motivation | Achievement desire, Vision, Goal | Achievement desire, Independency | Achievement desire |
| | Attitude | A risk-taking tendency, Endurance, Positiveness, Trust, Activeness | A risk-taking tendency | A risk-taking tendency, Positiveness |
| | Experience | Startup experience, Industry experience | Startup experience | Startup experience |
| | Capability | Founder/Management/ Organization capability, Market opportunity recognition, Industrial knowledge | Startup founder capability Business opportunity recognition | Expert knowledge |
| Business model | Technology | Technical innovation, Product strategy, Subsequent development | Technical development | Technical capability |
| | Market | Size, Growth rate, Market structure | | Size |
| Resource | Manpower | Startup team, Organization technical resource | | - |
| | Marketing | Strategy, Sales activity | | - |
| | Funds | Funding and securing the ability | Self-funds | - |
| | Network | Network existence and nonexistence and strategy | Business support network | - |
| Support system | Government | Government policy | Education, Support funds and Marketing | Startup promotion policy |
| | Society | Support system utilizes | Social network | Family/Colleague Network |
| | University | - | - | Startup support, Mentoring, Entrepreneurship program |

## IV. Case studies

## 1. Data and Methodology

The successes and failures of a student startup were analyzed through the case of a participant in the Startup Business Model Verification Program (hereafter Verification Program) at University H. Since the purpose of this study is to examine the success factors of the student startups, two conditions of success are considered: continuation of the business as of the end of 2018 and profits generation. Over the 2014-2016 periods, the number of participants in the Verification Program at University H was 356. The number of university students was 43 (12.1%), and only 33 of them had startup business model. The following is the general status of the 33 university student applicants for analysis of their application form, business plan, startup status, survival, and profitability.

First, there are 17 students at University H and 16 students from other universities. The characteristics of the startup business model are 16 in manufacturing and 17 in the knowledge service such as applications. Twenty-six students were at the idea stage and seven at the prototype stage. There are eight founders. They established companies from 2014 to 2016. As of December 2018, four startups are operating and making profits. It is interesting that all these startups have changed business models under the mentoring process of the University H until now.

## 2. A Successful Case

Company A started a business of offline event service using a bucket list[1], but failed to generate sales for a considerable period. The first sales were made with a video production service for a mentoring project, the Verification Program at University H. This service led the company to work in marketing content service, and it becomes a business model. In 2018, the company's sales were estimated at US$ 715,000.

### 2.1 Business Model
The business model is defined as 'event planning using the bucket list on SNS (social network service).' At that time, social trends making a bucket list and improving the quality of life were spreading quickly. In this situation, the

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[1] "Bucket list: What I really want to do before I die" is a 2007 comedy drama starring Rob Reiner, Justin Jackham, Jack Nicholson and Morgan Freeman. The contents are that two people with the last stage of cancer made lists to do before death, and to go on a trip.

founder wanted to provide an application-based platform to express common interests.

This business model needed a mobile application, so it needed software skills to develop servers and UI/UX-related design capability. However, the founder had only a low level of capability, and sales were not coming in because of similar service applications were available. As a result, the startup changed its business model into card-news production, video production, and marketing content production.

## 2.2 Founder

The founder started preparation for a startup since 2012, as a sophomore at University H, and founded a startup in 2015. After winning a prize at a 2012 presentation contest and a startup competition, entrepreneurship grew. During the preparation stage, he participated in a few courses and programs such as startup academy, business and investment exhibitions. In particular, he participated in the Verification Program of University H from November 2014 with the business model of 'event planning using SNS-based bucket list' and received support for the prototype production. The founder majored in Management Information System and benefited from short-term internships in mobile application development companies. He also possessed leadership abilities such as chairman of a government department. In particular, he could retain team members in the company by showing his vision of the company even in a difficult situation where sales had not materialized.

## 2.3 Resources

Company A was a private startup founded by a team of six people, eventually joined by three younger students from the Management Information System department and two students from the Multimedia department. They played an important role in the development of content for the startup's marketing content service. In particular, they strengthened its professional capabilities in response to market demands for card news production, video production, and marketing content production.

The team was aware of the lack of application development capabilities and turned to Facebook as a base for marketing. As a result, the number of Facebook page followers of the startup increased from 15,000 to about 300,000 by the end of 2018. In particular, various content posted on Facebook played a role in driving market demand. For example, activities such as receiving news from a published card and receiving a contract from a media company are linked to the demand of potential customers.

Business partners who introduced potential customers strengthened sales activities. And sales executive in their 50s with experience in big companies were recruited in 2018. As a result, new contracts were possible such as

developing marketing contents and video production for celebrities. Operating funds that were lacking at the beginning of the startup were covered by part-time jobs, and no cases of external funding were provided.

### 2.4 Support System

The range of policies that actively support student startups and youth startups has increased, and universities have also run various programs related to student startups. University H, where the founder graduated, is one of the leading universities in startup education, was supporting the startup through programs such as startup clubs and the Verification Programs. Support includes enhancing entrepreneurship, mentoring, and prototype production. There is also a degree program in the Convergence Startup major. The founder gained no direct benefit from the government's startup support grant. However, the startup founder received US$4,000 for application development through the Verification Program at University H. Also, he received periodic mentoring from a professor at the university on a market-oriented business model from 2014 to the present.

As a social support system, the family of the startup founder initially was strongly opposed. Nonetheless, the founder was firmly committed to the startup as an aspiration to live a different life than other students. The friends and juniors around the team recognized the positive aspect of the startup and supported its founder.

## 3. A Failure Case

We analyzed the case of startup Company B that ended up failing. After beginning the startup, the company focused on businesses related to character design development, but since its commercialization of flagship business model, business has been sluggish. However, though sales were stable at around US$9,000, it was closed down in 2019.

### 3.1 Business Model

The startup business model is 'Situation-specific infant emotional coaching doll fairy storybook' to solve the emotional intelligence problem of an infant's immature emotional expression or communication. Specifically, it is a product combining a storybook with a theme describing a specific situation, and a doll so that infants can express their feelings in various ways according to the story.

As regards technical factors, startup business model needs special know-ledge about childhood education, infant psychology and development, and fairy tales that deal with emotional issues in specific situations. Also, it is necessary to develop the design of characters, storybook design and editing that are applied to fairy tale books and dolls, as well as the skill to make character doll and

storybook. As regards market factors, the number of infants is decreasing due to Korea's low birth rate; the number of domestic births fell by 11.9% in 2017 (Statistics Korea, 2017). On the other hand, the infant/baby supplies market is growing at a rate of 10% each year, amounting to US$1.52 billion in 2017. However, the education supplies market for children with cognitive disabilities encountered difficulties.

### 3.2 Founder

The startup founder, a junior at University H, established the company in 2016 by preparing for startup through the activity of startup club starting from 2013. The founder majored in Business Administration and Convergence Startup, and had a career in character design and doll community. Also, the startup club member who had majored in Business Administration and Management Information and System, had doll making and sewing skills, but did not join the startup in 2016. Founders and team members have had a passion for startup since 2013, participating in various startup programs at universities and the local community. However, the startup founder did not have any experience in startup and related fields and did not have any familiarity with early childhood education, story development, and editorial design as technical factors related to entrepreneurial business model. Also, team members' ability in the production process of a prototype of sewing dolls was absent, so they were made externally.

### 3.3 Resources

Company B is a one-person startup that does not have core personnel such as a founding team other than the founder himself. As a result, sales were generated by the design development agency based on the character development capability possessed by the startup founder, but commercialization of the startup business model failed.

Also, the marketing channels were set via a bookstore and the education supplies market. However, in the case of bookstores, due to the problem of funding procurement in mass production, the company operated directly as a kindergarten, but did not open the market. This resulted in marketing failure owing to a lack of understanding of the characteristics of an education supplies market as a sizeable vendor-centered distribution market.

As regards funding, this one-person startup business was started with little initial fund.

### 3.4 Support System

Since the startup founder was a senior at University H at the same time as the successful case (Company A) described earlier, he was able to receive the same support as a successful startup. However, unlike Company A, the startup founder received a variety of support through government and university startup

programs. Regarding funding, about US$54,000 was received for technology commercialization from the local government in 2016, and through startup club activities at University H during 2013-2018. Moreover, the founder received mentoring from about 20 startup experts through various startup support programs. However, those various mentors provided different evaluations and advice. In addition, there is a problem that mentoring has been carried out mainly on the basis of a business plan for the purpose of receiving benefits from other startup support funds rather than addressing the startup's specific problems. The startup founder did not receive consistent mentoring for switching to market-oriented startup business model and managing a startup company.

Plans of the startup founder of Company B were also strongly opposed by family members. However, friends, juniors and university departments were positive and supportive. Also, there was no successful model that motivates the startup.

## 4. Summary of Case Studies

Table 8 shows the results of the analysis of the cases of success and failure of university students who participated in the Verification Program at University H. The startup founders operated their respective companies at the same time. The success factors of company A are as follows.

First, from a technical point of view, the founder changed the startup business model. In the process of implementing the startup business model, when the application development capability was lacking, the service was provided by switching to an existing platform based on Facebook. Second, from a market perspective, the founder changed the startup business model. As the market demand for the initial startup business model was insufficient, the target market was shifted to services such as card news, video, and marketing contents, whose market demand was confirmed through Facebook. Third, the characteristics of startup founders such as leadership and vision, examined by the characteristics of venture startup CEOs, were confirmed. Fourth, core manpower from the perspective of startup resources was secured. Even if the startup business model was changed, the team members through team startup secured the necessary capability.

Also, after the establishment of the company, the founder recruited a 50 year-old sales director to make up for the lack of experience of the university student startup. Fifth, the founder openly accepted the results of mentoring in the areas where he was lacking expertise. Mentoring and advice came from university professors regarding startup business model, and management of the company by senior founders.

**Table 8 Summary of case studies**

| Category | | Successful case (A Company) | Failure case (B Company) |
|---|---|---|---|
| Business model | Name | SNS-based event planning service (Change: SNS-based Marketing content service) | Emotion coaching dolls children's books (Focusing on character design development) |
| | Technology | Only a fraction of low level (Platform: App-based→Facebook-based) | Only a fraction of low level |
| | Market | SNS and bucket list spread. Easy entry into the related market (intensifying competition). | The decrease in the infant population, the growth of related goods market. Increase in children with cognitive disabilities, need to open up new markets. |
| Founder | Demographic | Male, University student, Management Information and System major | Female, University student, multi major (Management Administrator, Startup) |
| | Motive | Achievement desire, Goal, Vision | Achievement desire |
| | Attitude | Passion, Independency | Passion |
| | Experience | No startup experience, Short-term internship experience | |
| | Capacity | Leadership Low-level technology/knowledge capability | Low-level technology/knowledge capability |
| Resource | Manpower | IT and multimedia team members(5 people) | No professional manpower(team member) |
| | Sales | Facebook-based marketing Scout an older generation sales director | Inadequate marketing strategy Inadequate sales activities |
| | Fund | No capital(individual business) | |
| | Others | Various networks (business partner, startup CEO, professor) | - |
| Support system | Government | - | Local government's startup support fund (US$22,000) Mentoring focuses on business plan |
| | University | The Verification Program (US$ 4,000) Mentoring focuses on business model | Startup club, startup competition, Etc. (US$31,000) The Verification program Mentoring on startup business plan |
| | Society | Family opposition, Positive recognition of friends and juniors Management mentoring from startup senior and businessmen | Family opposition, Positive recognition of friends and juniors |

The failure factors of Company B are as follows.

First, the startup business model did not fit both the technology factor and the market factor. The startup founder relied on outside assistance to make up for the lack of technical competence as a one-person startup, and the market size and target market were unclear. Second, the startup was not sufficiently focusing on a market-oriented business model. Sales were generated by market demand related to the character design development of the startup founder. However, sticking to an existing business model, transition to the target market was insufficient. Third, there were insufficient resources to supplement the lack of knowledge of the university student startup founder. One-person founder could not access the resources needed to develop a business model and business operation other than enthusiasm. Fourth, mentoring by too many mentors interfered with the business. There was a trend that some mentors focus on the business plan to seek support from government startup programs, not market success. In the end, the failure case can be said that the startup targeted for government support, not a market success.

## V. Discussion

### 1. Summary

The purpose of this study is to identify success factors as a way to support student startups. To do this, we first looked at the success factors by analyzing previous research of student startups, youth startups, and venture startups. We also analyzed the success and failure cases of student startups.

Reviewing previous research, it is remarkable that university startups are similar to youth startups. First, there are not many studies on startups' success factors. Second, startup trials are given more focus than startups' actual market success. Third, there is no research on startup resources in student startups.

Case studies show slightly different results from the reviewed literature. First, enthusiasm, independence, vision, and leadership of the startup founder are important. In previous research, the educational and economic level, startup experience and personal capacity were suggested as the success factors. However, in the analysis of success factors of venture startups, business vision and leadership required by the startup team were included despite the lack of startup experience and low personal competence.

Second, a market-oriented startup business model is important. In the case analyzed, when sales picked up in related markets, successful startups shifted their business model to these markets if their original business model did not meet demand. Failing startups did not redirect their strategy. From this point of

view, it is necessary to select, verify, and switch the startup business model to the market demand. The study by Cho (2018) shows similar findings.

Third, regarding startup resources, startup team and generational convergence are important. Most startups lack resources. In particular, in the case of student startups, resources such as experience and knowledge are lacking, but they are rarely discussed as success factors in previous research. On the other hand, case analysis shows that team and generational convergence complement the shortage of company resources. The result supports the study by Bang et al. (2014), who suggested the startup team as a success factor in the case of startup founders in their 20s with low technical competence.

Fourth, the role of the mentor is important. The importance of mentoring is also presented in previous research. However, as a result of the case study, mentor selection and mentoring contents are also important because mentor ability addresses the problems associated with the setting up and operation of startup business model and startup resources of university student startup founders. The result supports the study by Chang et al. (2013) that mentoring affects the startup intention, that is, the establishment of a startup. However, it is different in that it is not included in the success factor if mentoring is not appropriate.

Fifth, a study major in startups, which some universities offer to students, does not guarantee success. This major teaches CEO's management ability, market opportunity recognition, and industry knowledge, etc. However, in a case study, a founder who studies for a second major in the startup department failed, whereas a startup founder who was not in the department succeeded.

Sixth, government and university startup support funds do not guarantee success. In the previous research, the startup promotion policy of the government, startup support funds, and university startup support activities are suggested as success factors. However, the successful startup received US$4,000 from the startup support fund of University H, while the failed startup received about US$54,000 from local government and University H. Therefore, unlike previous research findings, our study shows that government support is not necessarily a success factor.

## 2. Discussions and Implications

In short, students startup is a policy measure for employment, not market success. Therefore it needs to be changed to market success. This study sought to provide more effective advice to student startups from the standpoint of mentoring in startup education and university consulting. Therefore, our findings can lead to effective practical implications for startup policy.

First, student startups in Korea seem to be aimed at preventing the unemployment of university students. There is still an emphasis on startup trials rather than startup's long-term success. Therefore, the field of startups should be taught as a matter of survival after graduation rather than one of the activities outside the university.

Second, a business-oriented market education is needed. Understanding the market is essential for running a business with market-oriented startup business model. In Korea, however, most university students study market conceptually in the classroom. Because of this, it is not consistent with the market demand, and startup business model redirection takes place. Therefore, it is necessary to improve market education.

Third, there is a tendency for students to lack preparation for startup business model; they emphasize too much the starting phase. It is impossible to ignore the importance of startup business model and preparation for it. This may be the reason for the low sales of student startups.

Fourth, the mentoring program needs to be improved. Many programs operate mentor systems targeting different aims. Therefore, diverse mentors who focus on different targets can confuse students. It is necessary to introduce a market-oriented mentoring system.

Fifth, as the case study shows, the perception of parents and ordinary people about student startups is low in Korea compared to other countries. According to the Global Entrepreneur Index 2018, Korea ranked 24th. In particular, in the national cultural support, Korea ranked 27% lower than the US (82%), Singapore (72%) and China (43th, 33%). Sociocultural awareness of startup should be encouraged.


# VI. Conclusions

Student startups are expanding from the standpoint of promoting career guidance of graduates or preventing youth unemployment regarding new policy areas of government and startup education in universities. However, there is a lack of research. Therefore, it is necessary to pursue more intensive research on startups by university students, and lay out a comprehensive success factor approach as indicated in venture startup research.

In this respect, this study contributes theoretically in the following way. First, it is the first study that outlines the success factors of student startups. Many types of research on startups are focused on specific fields such as entrepreneurship, support system, activation, and performance. Therefore, comprehensive research results can be used as an index for the future of research. Second, case studies have complemented the examination of success factors

such as startup business model and startup resources that were not analyzed in previous research. If these factors are combined, they confirmed that the success factors of a venture startup are similar to those of a startup where sustainable management is possible.

Despite these contributions, this study has limitations. First, it has institutional limitations in that the student startups are subject to startup policy supports related to the economic situation of Korea. Success factors could be derived from the situations in the US and China. Second, there is a limit to the generalization of the research results because the study analyzes previous research and examines selected cases of successful and failed startups. Looking at thirty-three studies on student startups and investigating two case studies are not enough to generalize the findings.

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